Ventilated protection device against solar radiance

The present invention concerns a ventilated protection device against solar radiance, said device being able to provide a protection against the rain. The surface of the device is made of two or several layers of crossed, sideways not contiguous elements.

Current protection devices against solar radiance, notably awnings and parasols, present the disadvantage of inducing a warming of the air located on the shade side, leading to a temperature increase in the protected space.

The device according to the present invention improves notably users' comfort by a cooler shade, because said device allows the overheated air to escape outwards and reduces the solar radiance going through it. The aforementioned device is made of two or several layers of crossed, soft or hard elements (1), said elements being set up on one or several levels.

The elements crossing angle can vary according to configuration and to wished mechanical resistance against stretching. Elements of a same panel can be of different widths and form different angles with the perpendicular of said panel.

Elements crossing confers to the surface of the device a resistance to traction strains in all directions when elements are either assembled on a same level or strengthened by rims in two or more element levels versions. This feature allows for the making of shelters of varied forms, even simply stretched on stakes.

The device can receive a fix or vertically sliding top vent.

The device can be fit out with plates (2) hanging to all or to some vents. The aforementioned plates mask the Sun so as to protect users without preventing air circulation through said vents of all embodiments and versions of the device. The hanging elements are made of a part (mask) (3), the area of which is larger than that of the corresponding vent. The aforementioned mask is pierced to allow for a simple or a double cord (forming a loop) whose other extremity is fastened, in a preferred version, to a stem (4) in the case of small vents, or to two crossed stems (5) for long vents on a device presenting long

splits, the length of said stem being larger than that of the vent. Using a double cord (6) fastened to the stem or to crossed stems allows to modify the angle of the mask by letting the mask slide on the cord. The aforementioned plates mask thus a growing part of solar radiance (7) passing through the vent when the Sun nears the zenith, offering a maximal protection during the period of strongest solar radiance. The masks are hanging to vents at large enough a distance so as not to prevent air circulation. The plates are hanging to the edge of a single element of the device if this device is fitted with mobile shutters or with elements that are forming non perpendicular angles to the perpendicular of their panel.

Watertightness against the rain of the device is provided by mobile shutters (8), assembled on the lower edge of horizontally orientated elements. The cords (9) are the actuating parts of said mobile shutters, allowing, first, to adjust the split width to the sun light separately on each face of the device and, second, to achieve the watertightness of the parasol in case of rain by covering the upper edge of the next lower element on all panels of the device. The ends of each horizontally orientated element are actuated by crow's foot cords (10). The cords located on the side of the panel ridge slide in guides (11) located on said ridge. One side of the crow's foot is aligned on the ridge, the other side of the crow's foot forms a sharp angle with the lower edge of the cloth width so as to provide for edge tension when the former is folded upwards. The cord forming the crow's foot slides in a ring so as to allow for adjusting the crow's foot lengths to the lower edge movement. The actuating cord ends of each panel of the device are put together, thus allowing the handling of all mobile shutters of said panel in a single hand movement. A hem (12) on the lower edge of horizontally orientated panels avoids to transmit tension strains to the shutter. In the case of parasols, but this solution applies under other forms to any version of the device, cloth stripes located along the ribs stiffen the assembly and provide a supplementary protection against the rain for mobile shutter ends.

The device can be made according to two preferred embodiments.

In the first embodiment, crossed elements (1) are superimposed on one single level and can be assembled by sewing in the case of cloth widths. As in all embodiments of the device, elements of each level are spaced sideways so as to provide vents (13) allowing for air circulation between the internal room and the outside of the device. This version offers a good mechanical resistance to traction in all directions, which allows its use on light structures, possibly limited to a mounting on fastening devices on a wall, or on stakes for example.

In the second embodiment, crossed elements are located on more than one level, thus creating one air layer (14) or several air layers between the internal and the external surface of the device. Air circulation vents (13) are larger than in the first embodiment, because they are made of the whole length of spacings between elements on each level. In a version of this embodiment, elements of one level or more than one level are maintained by ties such as cords, the tension of which can be provided by elastic cords fastened between fastening devices on the structure and said ties. The free end of elements mounted in the vertical direction can, in an other version, be stretched by a cable (15) or by a cord, the ends of which are fastened to rib ends in the case of a parasol. In a third version, the free end of elements mounted in the vertical direction is, in the case of cloth widths, sewed on a cloth strip (16) fastened to rib ends of a parasol. In order to prevent spacing variation between elements of two consecutive levels due to elements deformation or to wind thrust, in a fourth version, said elements are connected by cords (17) or by other fastening devices attached to the superimposed elements. An other solution for preventing this distension consists in assembling one single rim of upper level elements to elements of the lower level, resulting in sloping elements. The ridges panels have in common can be fitted with elements such as cloth stripes, thus strengthening the whole structure and covering mobile shutter ends.

In a version of the embodiment with elements located on more than one level, elements of a same level (18) are not perpendicular with the perpendicular to their panel. This version comprises fastening parts (19) along the panel ridges,

said fastening parts including fastening extensions aimed for element ends of the device.

Appended drawings present several versions of the device's embodiments: Figures 1a and 1b illustrate possible layouts of the first embodiment of the device, in which the crossed elements levels are put together. The mobile shutters actuating mechanism (8) is presented in figures 2 (closed position) and 3 (open position).

Figures 4 (a cord, elements put together on one level embodiment), 5 (a cord, elements on more than one level embodiment) and 6 (a cord loop, elements on more than one level embodiment) show hanging light masks.

Figures 7 and 8 show the elements crossed on more than one level embodiment of the device, respectively in the free edge version, said edges being fastened on a tie stretched between a parasol ribs, and in the free edge version, said edges being attached by a cloth of canvas.

Figure 9 shows the crossed elements on more than one level embodiment of the device, in its version with superimposed elements, said elements being kept together by cords so as to avoid thickness changes of the air layer.

Figure 10 shows a possible configuration of the crossed elements on more than one level embodiment of the device, in its version with elements forming different angles with the perpendicular to the panel. A bracket providing sloping angles for the device elements is illustrated in (19). It is mounted on the panel ridge, with bracket pins fitting into adequate holes on the panel ridge. Figure 11 is the ground for the embodiment. It represents a parasol panel according to the second embodiment of the device.

In the embodiment according to figures 11a and 11b, the cloth widths, not contiguous so as to allow hot air evacuation (21), are positioned in the horizontal direction (20) on the upper face, and in the vertical direction (22) on the lower rib face of a collapsible structure typical for a parasol. The cloth widths tension along the ribs is provided by assembling said cloth widths with a cloth strip fastened to both ends of each rib and stapled or nailed on the rib. The vertically orientated

cloth widths are assembled in a triangle formed by a stretched cord on the lower face of rib ends by elastic rings (23), keeping apart the cloth widths respectively positioned in the horizontal and in the vertical directions. The space between the cloth widths panels of each face is provided notably by the rib thickness.

The device can be set up on structures like parasols, awnings for terraces (canopy, marquee), blinds, garden, beach or building sites shelters, stretched between poles or on one or several stakes, or on flexible pop-up poles similar to those used in camping tents.